

ON

THE POWERS

OF

THE ALPHABET

I.

TONIC SCALE OF ALPHABETIC SOUNDS

PRESENTED

AUTHOR

BY

THOS. GORDON HAKE

CTOR OF MEDICINE AND MEMBER OF THE ROYAL COLLEGE OF PHYSICIANS

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I.

A TONIC SCALE OF ALPHABETIC SOUNDS.

WITHOUT going over the history of the Alphabet, the most precious archæological treasure that has reached us, it may be remarked that while the Greek has been a chief source of grammatical symbols for later times, the order in which the letters are arranged, though changed, remains arbitrary, and is without any reference to their powers as the elements of written language.

It can only be surmised that this order of succession in the ancient alphabets was in a great measure due to the dates when individual letters were invented, but this does not explain the grounds on which the Greeks themselves assigned places to new symbols which they were led to adopt as their language advanced.

It is a circumstance deserving of notice that the first four letters in the Greek alphabet, the oldest of which there is any record, form a typical alphabet in themselves, consisting of one vowel and three consonants,—a labial, a guttural, and a palatal. When it is considered how many sounds a single symbol is able to represent in modern speech, it would not be surprising if the four letters *a, b, g, d* sufficed, in primitive times, to subserve every purpose in writing. In our own language the letter *p* presents several vowel sounds and some diphthongal notes hitherto solved, as those in *far, fare, fat, fate, war*, while con-

sonant symbols are made equally useful, *gh* sometimes representing even the sound of *f*.

When the barren results of an arbitrary arrangement of the letters are considered, and these are to be traced over a period of 3,000 years, it is singular that a classified one has not been attempted. The value of a tonic scale of alphabetic sounds has yet to be realised in its many applications, not the least of these to diphthongism, quantity, and accent. It is certainly remarkable that intellectual enterprise should have overlooked so fruitful a research as that of determining the natural order of succession in the elementary sounds of speech, an order which is to be found in the mechanism of the vocal apparatus itself.

There are certain properties of sound, well understood, which in themselves indicate order; these must be looked to for guidance in the classification of alphabetic sounds. In the first place every sound in speech has a certain pitch, but this depends partly on voluntary modulation, it being high or low in some measure at the option of the speaker; and still more it depends on the range permitted to individuals by the vocal organs themselves.

The order of sequence in alphabet sounds, therefore, cannot conveniently be based on pitch.

Again there is a certain quality or *timbre* in speech, but this is complex, and it also arises in part from the voluntary modulation of the voice during which auxiliary sounds are added to simple ones for the purpose of effecting their junction; for instance, as when *õõ* is interposed between *õ* and *m*, in *home*.

A natural alphabet, therefore, cannot in the first instance be based on *timbre*, or quality of sound.

But there is intensity, that is, amplitude of vibration or loudness, which is subject to no such exceptions, and on this principle the sequence of alphabetic sounds can be based in the most perfect manner.

This property of sound coincides exactly with what is called quantity in speech, a term which defines the length of vocal sounds and is equally applicable to that of letters and syllables.

The organs of speech are so constituted that some sounds belonging to them are loud, some whispered, some nearly mute.

The sounds of *a* in *father*, of *r* in *rack*, are loud; those of *s* in *will*, of *f* in *fan*, are whispered; those of *c* in *ac* and of *g* in *ag* are mute until made articulate by means of an auxiliary, such as the breath sound of *e*, in *her*; or by an additional syllable, such as *tor* after *ac*, as in *actor*.

Different degrees of loudness, then, affect the alphabetic series of sounds according to a physical necessity; the restricted organism forbidding a short sound to be prolonged or loudly uttered. For example, *c* and *g* cannot be pronounced with as great length as *s* or *f*, and these cannot be made to reach the continuous length or fulness of *r* or of *a*.

Intensity of sound, then, which in the vocal apparatus thus represents quantity, is a secure basis on which to classify the alphabetic sounds in the order of their length.

This is of much importance, for it will ultimately be found that quantity is the ruling principle in speech, and that whatever may pertain to accent, diphthongism, and kindred subjects, rests on the relative lengths of the letters; it is this which determines the powers of the alphabet. The Tonic Scale, which follows later, is derived from these relative lengths through a process of inductive reasoning which will be stated in full; but at this stage no advance can be made before examining the exact value of the English alphabet for the purposes of this paper. When this has been done, the genealogy of alphabetic sounds will be traced, and a method of constructing a tonic scale discussed.

THE ENGLISH ALPHABET.

A represents the vowel sounds of *a* in *far* and in *flat* (\bar{a}' , \bar{a}'); of *a* in *hare*, which is the same as *e* in *there* (\bar{a}); and the short sound of which is *e* in *per* (\bar{a}). It stands also for the diphthongal sound of *a* in *fate*, which is compounded of the \bar{a} sound in *ec* (ecclesiastic), and the \bar{e} sound in *it* and *eat* ($\bar{a} \bar{e}$).

B represents the consonant sound of *b*, both as an initial and terminal, as in *ba* and *ab*.

C represents the consonant sound of *c* as an initial and terminal, as in *ca* and *ac*; which is the same as that of *k*, as in *ka* and *ak*; that of *q* before *u* in *quart*, and after the other vowels; and sometimes that of *s*, as in *cin*.

D represents the consonant sound of *d* as an initial and terminal, as in *da* and *ad*.

E represents the vowel sounds of *e*, in *he* (\bar{e}), and in *him* (\bar{e}); of *e* in *her* (\bar{e}'), and of *u* in *hurry* (\bar{e}').

F represents the consonant sound of *f* as an initial and terminal, in *fi* and *if*.

G represents the consonant sound of *g* as an initial and terminal, in *ga* and *ag*; also that of *g* and *j*, as in *gaol*, *jail* (\bar{dzh}), and that of *g* as the initial of *George* (\bar{dsh}).

H represents the initial aspirate of the vowels, and the super-sibilation of *s*, in *ash*.

I represents the vowel sound of \bar{i} in *him* and the diphthongal sounds of *i* in *isle* and *by*, which are compounded of the \bar{a}' sound in *flat*, and the \bar{e} sound in *it* or ($\bar{a}'\bar{e}$).

J represents the consonant sound of \bar{dzh} , as in the second *g* in *George*, the *g* in *gaol*, and the *j* in *jade*.

K represents the consonant sound of *C* as above stated.

L represents the consonant sound of *l* as an initial and terminal, in *la* and *al*.

M represents the consonant sound of *m* as an initial and terminal, in *me* and *him*.

N represents the consonant sound of *n* as an initial and terminal, in *no* and *an*.

O represents the vowel sounds of *o* in *owe* and of *o* in *hō!* (\bar{o} , \bar{o}); also of *o* in *or*, and of *o* in *not* (\bar{o}' , \bar{o}').

P represents the consonant sound of *p* as an initial and terminal, in *pa* and *ap*.

Q represents the same sound as *C*, *K*.

R represents the consonant sound of *r* as an initial and terminal, in *ra* and *ar*.

S represents the consonant sound of *s* as an initial and terminal, in *sa* and *ass*; also the consonant sound of *z* in *as*.

T represents the consonant sound of *t* in *ta* and *at*.

U represents the vowel sound of *u*, as in *bull* (\bar{oo}), which is the same as that in *wood*; of *u*, in *rule* (\bar{oo}), which is the same as that in *fool*, and the diphthongal sound of *u* in *mute*, which is compounded of \bar{e} \bar{oo} .

V represents the consonant sound of *v* in *va* and *av*.

W represents the consonant sound, which is initial only, of *w* before \bar{oo} , as in *wool*, and before \bar{oo} , as in *woo*, *swoon*. It also represents the vowel of *w* as an initial, in the following diphthongs, in which, by a fiction of grammar, it is still regarded as a consonant: \bar{oo} \bar{a}' , as in *warm*, provincial, rhyming with *harm*; \bar{oo} \bar{a}' , as in *whack*; \bar{oo} \bar{a} , as in *ware*; \bar{oo} \bar{a} , as in *wherry*; \bar{oo} \bar{e}' , as in *whirl*; \bar{oo} \bar{e}' , as in *worry*; \bar{oo} \bar{e} , as in *we*; \bar{oo} \bar{e} , as in *whim*; \bar{oo} \bar{o}' , as in *war*; \bar{oo} \bar{o}' , as in *wot*; \bar{oo} \bar{o} , as in *woe*; and \bar{oo} \bar{o} , as in *wōke-ūp*. Further, it represents the vowel sound of *w* as a terminal in the diphthongs \bar{a}' \bar{oo} in *how*, \bar{e} \bar{oo} in *few*, and \bar{o} \bar{oo} in *low*.

X represents the consonant sound of *z* as an initial, as in *xanthic*, and of *ks* as a terminal, as in *hacks* and *axe*.

Y represents the consonant sound, which is initial only, of *y* before \bar{e} and

, as in *yēar* and *yē*. It also represents the vowel sound of *y*, as in *happy* (*ē*). It further represents the diphthongal sound of *y*, as in *fly* (*ǎ' ē*). Lastly, it represents the vowel sound of *y* in the following diphthongs: *ě' ā'*, as in *yard*; *ě ā'*, as in *yap*; *ě ā*, as in *yare* (rhyming with *fare*); *ě ă* as in *yes*; *ě ē'*, as in *yearn*; *ě ō'*, as in *York*; *ě ō'*, as in *Yorick*; *ě ōō* as in *you*; *ě ōō*, as in *sanctuary*; *ě ō*, as in *yoke*; *ě ȳ*, as in *Yeōmínster*.

Z represents the consonant sound of *z*, as an initial and terminal, in *azure* and *zebra*.

It is a result of experience that this alphabet, complicated as it is, performs the work of written speech with the same facility as if every sound were separately represented by a symbol of its own. This is due to the ample time which is at every one's disposal for acquiring his native language, a task rendered the more easy by a circumstance deserving attention, which is that where elementary symbols fail in giving orthographic expression to a sound, the mind unconsciously adopts the concrete symbol. Thus when the combinations by which the syllables *for* and *law* are spelt are considered, it is plain that the first is made up of phonetic symbols, and the second not; the latter, however, is a concrete symbol, so familiar that it conveys the sound that it represents exactly in the same manner as if it were phonetically spelt, and a further consideration will show that all syllables, however they may be spelt, are concrete symbols which, without calling for reflection, convey to the mind the true sound which they are intended to call up.

If a language could be spelt phonetically it would still resolve itself into concrete symbols in the hands of all who read habitually. At present such a language does not exist, for there are not letters in any alphabet in sufficient number to tell the sounds of speech even if there were a settled pronunciation. Forty letters would scarcely exceed the number required: in English there are only 26, in French 26, in German and in Latin 25, in Greek 24, in Hebrew and Chaldean 22, in Italian 20.

It is, therefore, necessary, in a research of this kind, to adopt a modified notation by means of which reference may be made to specific sounds, and for this purpose the vowel symbols employed in the above alphabet will be made use of here.

As regards what must one day become a leading question, that of the evolution of alphabetic sounds, it is immediately

observable that the shortest of these are the mutes. These are six in number, and will be shown to follow each other thus, in the order of their length : *c, g ; t, d ; p, b*. The relative quantities in these is measurable by the distances between the seats of their production, namely, the guttural, palatal, and labial stations, and the central organ of vowel sound, known as the vocal chords. The station at which the sounds of *c* and *g* (as in *ac, ag*) are uttered, is the guttural, which is the nearest to the vocal chords ; that of *t* and *d* (as in *at* and *ad*), is the palatal, which is more distant, and more open ; that of *p* and *b* (as in *ap* and *ab*), is the labial, which is still further off, and the space between it and the chords more ample, allowing of greater fulness of sound without reference to pitch.

The difference between the sounds of the pairs in themselves, *c, g ; t, d ;* and *p, b*, is due to a lower pressure of the tongue on the palate, or a fuller pressure of the lips together, as it may happen ; by this slight functional adjustment *g* becomes a fuller sound than *c*, *d* than *t*, and *b* than *p*.

The next question of moment in connection with this inquiry is the manner in which a new series of sounds is evolved from the mute-stations. The sound of a mute used as a terminal is incomplete, and becomes fully formed only by ending it with the auxiliary sound of *ě'*, or by a new junction, as, for example, the *c* in *ac* with the *t* in *tor ; actor*.

The mute, however, is forced into full articulation by two other means ; the first, as in the case of the gutturals, *c* and *g*, is the acquisition of a final sibilant at the palatal station, their own station being incapable of sibilation. Thus *c* becomes *x* (*ks*), as in *axe* ; and *g* becomes *gz*, as in *hags* ; the first of these gutturals being unable to blend with *z*, or the second with *s*, in free speech.

The other means by which a mute is forced into full articulation is, as in the case of *t, d*, to continue its sound at its own station, in this instance at the palatal ; thus *t* becomes *ts*, as in *bats* ; *tsh*, as in *hatch* ; while *d* becomes *dz*, as in *lads*, and *dzh*, as in *badge*. In these instances *s, z, sh, zh*, are also produced independently of their cognate sounds. As with *c, g*, so it is with *t, d* ; *t* does not blend with *z*, nor *d* with *s*.

Thus the station of *c, g*, which are the shortest sound-

symbols, does not evolve any other sounds, borrowing its sibilants *s* and *z* from the adjoining palatal station, where these originate and become further enlarged by the aid of fresh sibilation. The important station of *t-d* is the source of three groups; the first of these derived from *t* is *s*, as in *hats*; and this sound by a modified sibilation between the tongue and the palate lengthens itself into *sh*, in *hatsh* (hatch); while *d* in like manner evolves *z*, in *as*, and this goes into *zh*, the final sound in *badge*. From *zh*, further, by a slight adjustment, the consonant sound of *y*, in *ye*, is produced and this initiates the sound of *ē* and of its higher tone, *ě*.

The second group consists only of two sounds *th*₁ and *th*₂. When *t* is uttered as a terminal, in *hat*, and the tongue is made to slide to the teeth, the sound is converted into *hath* (*th*₁), and by deeper pressure of the tongue against the teeth it becomes *th*₂, as in *with*, *wither*.

The third group of sounds originated at the *t-d* station consists of *n* and *l*. When *t* is sounded as a mute terminal the sound of *n* is readily thrown out, and that of *l* made to follow it, without change of position in the organ.

It is not to be overlooked that the action employed in evolving these last sounds is correlative, either being capable of producing the other two; but as *n* and *l* are longer than *t*, it is necessary to regard them as derivatives in tracing the rudimentary or mute sounds into a higher development.

These derivatives of the palatal mutes are evolved from terminals; but passing on to the derivatives of mutes which are thrown out at the labial station, it is found that the law changes, and that the first group is derived only from the initial powers of *p* and *b*. The attitude of the lips in pronouncing these letters is such that the consonant sound of *w*, in *wōō* and *wōō*, is evolved by the slightest physical adaptation; which leads on with the same facility to the vowel sounds of *ō*, *ōō* and *ō*, *ō*.

The labial, *m*, forms a separate group by itself at the *p-b* station, and is derived from these letters in their initial action. When the lips are placed in the position to pronounce *p* or *b*, they are enabled also to give out the sound of *m*.

Another and singular group of this station consists of

the sounds of *f* and *v*, which form a sort of link between the *t-d* and *p-b* stations. The prototype of *f-v* is *th*: the dental rest of *th* being employed while the lower lip becomes the homologue of the tongue, this pressing on the teeth gives passage to the modified sounds of *f* and *v*.

By these means all the consonant sounds except *r*, as well as the six vowel sounds which have a consonant origin, are evolved.

The sound of *r*, like that of the vowels of the vocal chords, *ě'*, *ǎ*, *ǒ'*, *ǎ'*, and their long sounds *ě'*, *ā*, *ō'*, *ā'*, will be considered later; they are of independent origin.

Thus, with the exception of *r*, all the consonants are evolved in an order of succession from two stations, those of *t-d* and *p-b*, and all, therefore, have their origin in mutes. They form two scales—that of the *t-d*, and that of the *p-b* stations. But these scales do not indicate the true order of length; they form only what may be called diatonic scales, the intervals of which have to be filled in, and then totally readjusted, by arranging the elements of the two in such a manner as to form a single scale.

The following is a formula of the mutes and their derivatives, *r* being added; it exhibits the intervals in the diatonic scales, and the numbers belonging to each in the tonic scale:—

- (1) C, (2) G.
 (3) T, (*ts*); (14) S; (9) *tsh*; (*ch*); (16) *th*₁; (17) *th*₂.
 (4) D, (*dz*); (15) Z; 10 *dsh* (G); (11) *dzh*, (G); (24) *y*; (33) *ě*;
 (26) *ě*.
 T }
 D } (20) *n*; (22) *l*.
) P.
 (6) B; (25) *w*; (34) *ōō*; (27) *ōō*; (38) *ō*; (31) *ō*.
 P }
 B } (21) *m*.
 (18) F; (19) *v*.
 (23) R.

It is purposed to now give the tonic scale for facility of reference, while the proofs of its accuracy are advanced. It includes the vowels proper to the vocal chords, as well as those which have a consonant origin.

A TONIC SCALE OF ALPHABETIC SOUNDS.

	Singular	Plural	
1. C . . .	ac	acs	
2. G . . .	ag	agz	
3. T . . .	at	ats	
4. D . . .	ad	adz	
5. P . . .	ap	aps	
6. B . . .	ab	abz	
7. X (cs) . . .	ax	—	These sounds from X to Z can be no further length- ened by the <i>s</i> and <i>z</i> plurals; therefore <i>e</i> is inserted be- fore the plural suffix, as in <i>aves</i> , &c., making them dissyllabic
8. Gz . . .	agz		
9. Ch (tsh) . . .	atsh		
10. G (dsh) . . .	initial only		
11. G (dzh) . . .	adz		
12. Sh . . .	ash		
13. Zh . . .	azh		
14. S . . .	ass		
15. Z . . .	az		
16. Th ₁ . . .	ath ₁	aths	
17. Th ₁ . . .	ath ₂	athz	
18. F . . .	af	afs	
19. V . . .	av	avs	
20. N . . .	an	{ ans	The sounds from N to R are pluralised only by <i>s</i> , but they bear being lengthened by <i>z</i>
		{ anz	
21. M . . .	am	{ ams	
		{ amz	
22. L . . .	al	{ als	
		{ alz	
23. R . . .	ar	{ ars	initials only
		{ arz	
24. Y . . .		{ yě	
25. W . . .		{ yē	initials only
		{ wōōl	
		{ wōō	
26. ě . . .	ic (stick)		
27. ōō . . .	ook (hook)	—	Oxytons, bearing only the acute accent
28. ě' . . .	uc (luck)		
29. ā . . .	ec (sect)		
30. ō' . . .	oc (October)		
31. ē . . .	ot (notation)		
32. ā' . . .	ac (act)		
33. ē . . .	eke		
34. ōō . . .	ook (luke)	—	Barytons, bearing only the grave accent
35. ě' . . .	irk		
36. ā . . .	hare		
37. ō' . . .	ought		
38. ō . . .	note		
39. ā' . . .	art		

In a new alphabet, based on relatively increasing lengths, there is no difficulty in giving the first place to the mutes in the order prescribed : *c, g, t, d, p, b*.

The first aid that the mutes receive in rendering them more fully articulate is derived from the suffix of *s* and *z*; *s* being congenial with *c, p*, and readily pronounced in conjunction with these sharp sounds; and *z* with *g, d, b*. Thus the difference in fulness between *s* and *z* is an exact measure of that between *c* and *g, t* and *d, p* and *b*; a measure which will be of much value later.

As the mute sounds lengthen, so do their derivatives in the same ratio, whence *x* (*cs, ks*) and *gz*, naturally fall into the place next to the mutes, as seen in the tonic scale above. Then follow the derivatives of *t* and *d*, in due order. But the first derivative of *t* is *s*; and if a new symbol, that of *ts*, were introduced into the alphabet, its place would be next to *ks* (*x*).

The derivatives of *t* and *d* constitute with *f* and *v* the sibilant class of consonants. It is at *t* that the sound of *s* is actually produced; in like manner, that of *z* takes its origin at *d*. These two leading sibilants, *s* and *z*, by equal steps extend themselves into *sh* and *zh*, first as heard respectively in the word *catch, tsh*, and in the initial of *George, dsh*; secondly, in the terminal sound of *George, dzh*, and of the word *badge*. In these combinations *d* evolves the derivatives of *s* as well as of *z*.

Thus *s* and *z*, in taking a separate place, still leave their higher sounds, *sh, zh*, to act alone; these are more opened and prolonged than *tsh, dsh, dzh*, respectively, but are higher than *s* and *z*. The mechanical cause of this, as well as the rational, is obvious when the movements of the tongue are followed; it is readily observable that, through the sibilant series, *tsh* (*ch*), *dsh, dzh, sh, zh, s, z*, the cavity of the mouth gradually deepens, owing to the descent of the tongue, which forms its floor; and that the amplitude of vibration is thus increased with the utterance of each successive sound.

Th, in its sharp and flat sound, which gives the pair of *th₁, th₂*, and *f v*, which form the next pair, can be considered both separately and in connection. *Th*, though not recognised

in the alphabet, has a necessary place in the scientific scale of sounds, and demands two symbols for the same reasons that favour the use of *f* and *v*, as shown in the initial sounds of the words *thing* and *this*, which are as general as those of *f* and *v* in such words as *fan* and *van*. *Th* is the metastatic sound of *t* transferred to a more distant station, whence its greater fullness; and it is a dental sibilant of its palatal congener *tsh*. On the other hand, *f* and *v* (the analogues of *th*₁, *th*₂) are dental sibilants, effected by the aid of the lower lip, which in generating them becomes a tongue. This set of actions, which completes the sibilant series, shows that *f* and *v* follow *th* in the scale; slight as the difference may seem between them, the aperture of the first pair is less open than that of the second, consequently their sounds are more impeded in their utterance.

Of the four remaining consonant sounds exclusive of *y* and *w*, which are only initial, *n* is the shortest; its buccal aperture is greater than that of *v*, which precedes it, and though the cavity of the mouth is diminished by the up-rising of the tongue as compared with its passiveness in the production of *v*, this throws the sound of *n* into the nasal cavities, by means of which it is amplified. This sound of *n*, on the other hand, is less full than that of *m*: in producing the latter the tongue drops; the mouth thus acquires its greatest diameters as a close cavity; and the sound finds fullest egress through the nasal aperture, owing to the closure of the lips.

But little need be said to show that *l* and *r* follow next in succession to *m*: these have both the entire range of the open mouth, and would be equal but for the attitude of the tongue, which in pronouncing *l* rests on the palate but is free when it pronounces *r*.

It is observable that the elements of speech thus classified take their place as pairs from *c-g* to *f-v*, except that the power of *t* is single while that of *d* is double in producing the acute and grave *g* (*dsh-dzh*) by means of sibilation. It has been previously noted that the difference in length between *s* and *z* is a test of the difference between the elements of pairs. This *s-z* test is yet further applicable, for it is seen that *s* is not pronounceable after the grave element and that *z* is not pronounceable after the acute. This is further noticeable than has yet been indi-

cated in th_1-th_2 , and in $f-v$; these pairs unite easily with s and z only in the manner explained, which is distinctive of pairs; and in all pluralisation when plurals are written with s , the sound itself follows the law which is here noticed.

The power of d in uniting with both s and z (with the former as sh), is an early type of what is developed later, and as such has significance. It is repeated fully in n, m, l, r , and yet more fully in all the vowels. The $s-z$ test applied to the four consonants just named shows that these elements possess in themselves the dual power; each freely appends to itself both s and z : $ns-nz, ms-mz, ls-lz, rs-rz$, are pronounceable without effort.

This power not only resides in the vowels but is reduplicated in them, for these are not only in pairs, acute and grave, $ō-ō̄, ě-ě̄$, &c., but the elements of each pair have a double power of appending the sibilants; thus $ōs-ōz, ōs-ō̄z, ěs-ěz, ěs-ě̄z$, and so on through the series of vowel sounds, are equally pronounceable.

The work to be next entered on for verifying a tonic scale is to determine the relative lengths of vowels. In classifying the consonants a basis of arrangement is discovered in the distance of the stations from the vocal chords, the greater or less amplitude of spaces in which the sounds are evolved, and the size of the apertures through which they pass. But it is more difficult to decide on the relative length of vowels which proceed from one and the same central station, the vocal chords. The task involves a wholly new research into quantity, and until this is satisfactorily carried out in all its bearings the tonic scale must remain incomplete.

The main difficulty is that of obtaining a fixed standard of length which, though varying with circumstances, is at all times subject to laws. This standard is not to be found in what is recognised as long and short quantities; the long are completely under a speaker's control, who emphasizes them at will, and the short are equally dependent on voluntary utterance, which may be rapid or slow. It cannot be said that either long or short quantities offer a determinate standard of length, while themselves subject to no law. But is there not a third quantity in speech which has escaped the attention of

scholars? That it is so, and that this third quantity affords the standard in question, will be now shown.

There are three sounds to be considered in speech in respect of their relative length—the long, the short, and the middle. The long sound is a monosyllable on which emphasis may be impressed without disturbance to euphony, but on which, under such circumstances, the accent cannot rest; the short sound is incompatible with emphasis, it is also incompatible with accent, which is always followed or preceded by it in the body of a paragraph; the middle sound is the only one that can bear the accent. This third quantity is destroyed by emphasis; it can be neither lengthened nor shortened except by laws of its own, which will be deduced later. To demonstrate the universality of this third quantity, typical examples will be made available; the first series of these will consist of the consonant sounds which act as terminals, twenty-three in number, each being preceded by a vowel:—

1.

Long sound	Middle sound	Short sound
1. āc	áccěnt	āccúse
2. rāg	rāggěd	Ārāgōn
3. cāt	cāt-like	cātastrōphě
4. ādd	ádděr	āddítionāl
5. lāp	lāp-dōg	lāpél
6. āb	ābbōt	ābróad
7. āxe	áxlě	clímāx
8. (gs)	—	—
9. ārch	ārchěr	ārchbíšhōp
10. (gsh)	—	—
11. cādge	cádgěr	cājóle
12. āsh	āshěn	péarl-āsh
13. (āzh)	—	—
14. āss	ásīnīne	āstrólōgỹ
15. ās	ázūre	āsbéstōs
16. cāth	Cáthěrīne	cāthédral
17. gāth	gáthěr	Āgāthā
18. ráff	ráfflě	gírāffe
19. hāve	háving	āvídītỹ
20. bān	bānněr	bāndítī
21. ām	ámber	āmbígūōūs
22. māl	mállět	mālígnānt
23. cār	cártěr	cārótīd
24. (y)	—	—
25. (w)	—	—

It is to be observed that the long sounds, marked as such, are so only in relation to their own accent lengths, and to their own short sounds, in the above series of comparisons between a long, middle, and short sound.

The second series consists of the vowel sounds, fourteen in number, as found in syllables :—

2.

	Long sound	Middle sound	Short sound
1. ě	hŷmn	hŷmn-book	hŷmnólögŷ
2. ǒǒ	fŷll	fŷlsǒme	móuthfŷl
3. ě'	bŷt	bŷttĕr	wíne-bŷtt
4. ǎ	bĕt	bĕttĕr	álpĥābĕt
5. ǒ'	Gōd	gódľŷ	Gódólphĭn
6. ǒ	hō!	nótĭce	ánnotātĕ
7. ǎ'	āt	átľās	āttáck
8. ē	rēel	réelĭng	cóttōn-rēel
9. ǒǒ	cōol	cóolĕr	wíne-cóolĕr
10. ē'	hĕrd	hĕrdĕd	swíne-hĕrd
11. ā	faĭr	faĭrŷ	hórsē-faĭr
12. ǒ'	cōrd	córdĕd	Córdéliā
13. ǒ	flōat	flóatĕd	flótĭllā
14. ā'	cānt	cāntĕr	ĭncāntátĭon

As in the series which precedes it so in the above, the long sounds, marked as such, are here long in relation to their middle sounds, or accent-lengths, and to their short sounds. It is nevertheless to be borne in mind that the above vowels divide themselves into two sub-series, each consisting of seven sounds, and that the first of these sub-series are the acute or upper sounds, and that the second are the grave or lower sounds of an entire series.

The same remarks are applicable to the series of diphthongal sounds which is arranged on the basis of a tonic scale like the vowels, and which is as follows :—

3.

	Long sound	Middle sound	Short sound
1. ě ǒǒ	—	—	sáncťŷǎrŷ
2. ě ě'	hĕre	cōhĕre	hĕreǎftĕr
3. ě ǎ	yĕll	yĕllǒw	dóg's-yĕll
4. ě ǒ'	yācht	yāchtĭng	stĕam-yācht
5. ě ǒ	yĕo	yeómān	Yĕo.Mĭnstĕr
6. ě ǎ'	yāp	yāppĭng	dóg's-yāp

	Long sound	Middle sound	Short sound
7. ě ōō	mūte	mútāblē	mūtātiōn
8. ě é'	yēarn	yéarnīng	héart-yeārn
9. ě á	yāre	yārelŷ	—
10. ě ó'	Yōrk	Yórkshīre	Yōrk Mínstēr
11. ě ó	yōke	yókēl	óx-yōke
12. ě á'	yārd	yārdmān	póultrŷ-yārd
13. ōō é	whīm	wómēn	nēw whīm
14. ōō é'	tōūr	toúrnāmēnt	spórtīng toūr
15. ōō á	wēb	wéblēss	wēb-fóotēd
16. ōō ó'	whāt	wáttlē	cāne-wáttlē
17. ōō ó	wōe	wóeful	—
18. ōō á'	whāck	wháckīng	—
19. ōō é	wēak	wéaklīng	wēak-míndēd
20. ōō é'	wōrm	wórmŷ	eārth-wōrm
21. ōō á	wāre	wārehóuse	eārthēn-wāre
22. ōō ó'	wār	wārlike	wār-báttērēd
23. ōō ó	wōke	Wókīng	wōke úp
24. ōō á'	—	—	—
25. e'	—	—	—
26. á ě	āche	áchīng	toóth-āche
27. ó' ě	bōy	bóyīsh	póstboŷ
28. ō é'	ōre	óre-stōne	góld-ōre
29. ó ōō	nōte	nótēd	nótóríōus
30. á' ě	hīgh	hīghēr	hīgh-míndēd
31. á' ōō	mōunt	móuntāīn	pārāmóunt

These three series of examples will repay the most careful study as showing that the mesotone has not only the most important place in quantity, but that, unlike the long and short sound to which it is related, its length is fixed. Referring to the second series, that of the vowel sounds, the sound of *car* may be lengthened at will, but when the sound of *ter* is added to its elongated form the accent is lost. In like manner it may be attempted in vain to add the short syllable of *cártēr* to the short syllable *cār*, as found in *Cārlóttā*; the sounds of *cār* and *tēr* only become balanced and unaccented. It should also be observed that the short sound of *cār*, in *Cārlóttā*, *cārótīd*, is not longer than the sound of *a* in *fat*; but that latter sound is long among oxytons, as seen in the formula *āt*, *átlās*, *áttáck*.

Some of the oxytons, for they have not all been considered by writers, have been set down as wholly different from their grave sounds. The *a* in *fat* has been pronounced to have no relation with the *a* in *father*: this is an error; they differ only in position and length. By referring to the tonic scale and ex-

amining it with a detail now to be pointed out, it will appear that there is a gradual *crescendo* of vowel sound from \check{a}' in *ac*, to \bar{a}' in *ar*, in which latter the vowel is free and under no consonant control as regards length: a circumstance which will be explained in connection with *timbre* and euphony when these subjects come to be treated of. This increase is noticeable in the difference between the *a* in *ac* and *av*, still more so that between *ass* and *am*, the vowel sound of which latter comes close to that of *ar*. Those who are able to follow this *crescendo* of sound with their ear will be able further to observe that in the flat consonants of each pair there is a marked tendency in the vowel to touch on the grave sound of *a*; it is noticeable even in passing from *ac* to *ag*, *acs* to *agz*; and in the plurals more than in the singulars. This tendency becomes the more remarkable the more it is examined; and it affects all oxyton vowels alike.

In treating of accent-lengths it is valuable to see that length of sound is relative throughout the tonic scale. The accent length is no exception; the only difference between it and the long and short sounds being that it is inflexible in its relations with these, and that its quantity is adjusted to their quantity; causing even long sounds, where they cannot be shortened for its display, to give place to shorter and less refractory ones.

The accent length is the mesotone of every sound that is susceptible of being subdivided into lengths, and this applies to nearly every sound. But exceptions present themselves. The diphthong $\check{e} \check{o}$, which is the *u* in *Janŭary*, *sanctŭary*, *actŭary*, &c., is so short that it cannot readily be formulated as a long, middle, and short sound. This is true also of its reversed form, the diphthong $\check{o} \check{e}$, the *we* which is the first syllable, in *women*. These diphthongs and their elements are the shortest sounds in speech.

It should be obvious from the examples given that accent is always associated with a middle length. The difference in quantity between the first, second, and third form of the same syllable under the conditions laid down makes itself evident to the ear. In the three words, *cāt*, *cātăcōmb*, *cătăstrōphě*, it is impossible to carry a same length from the first to the second, or from the second to the third example. Of course every word is liable to accent, but the comparison here is between the un-

accented and accented syllable the note of which differs, that of the former being complete in itself and susceptible of a stop, while that of the latter is cut short without pause and accommodates itself to the succeeding sound or sounds, so as to observe continuity, or if it ends a sentence it is with the sharp sound used by the Italians in those final syllables which were accented penultimately in Latin.

It is not to be supposed that the accent which produces the middle length is identical with it; accent, whether acute or grave, depends on a law of its own, which differs physically from quantity, is identical with pitch, and is acute or grave not by custom, but through the circumstance that certain acute accent-bearing vowels and grave accent-bearing vowels exist which the mechanism of the vocal organs can only give utterance to as acute and grave.

The universal prevalence of middle lengths in association with accent finds confirmation in the union of consonants as well as of vowels. In the word *arĕm*, the sound of *r* prevails over that of *m*; as in the letter *I*, the sound of *ă'* prevails over that of *ě*; of this principle examples will be set forth later to show that accent is latent and takes its origin in diphthongism. The combinations *rĕm* and *ă'ě* are alone sufficient to fix attention on a fact so complete in its bearings.

The middle lengths, now insisted on, always bear the same relation to their long and short sounds, but not to each other, for they are further proportionate to consonant lengths. Thus the syllable *ac*, in which *ă'* is limited by the short sound of *c*, as short as it is, becomes shorter in the word *ăccĕnt*, still more so in the word *ăccŭse*, and the proportionate lengths of the syllable so placed is preserved in all instances of the same type. But the syllable *am* is longer than *ac*; and in the changing lengths of *am*, *ămbĕr* and *ămáze*, the same proportion is observed, whence it necessarily happens that the middle length in the word *ăccĕnt* is shorter than that in the word *ămbĕr*.

The accent lengths then are not the same, but are always of the middle sound, whether that be acute or grave.

Every sound in speech, thus, has its middle length; and this affords a standard of measurement when two sounds susceptible of diphthongisation are brought together.

This instrument for ascertaining comparative lengths will be applied to the vowels, the relative lengths of which by our present means cannot be otherwise well determined. These consist of a double series, each of which has seven elementary sounds, the one series taking the high pitch, the other the low; the one when accented bearing the acute, the other the grave tone. This distinction gives a perfect means of classifying the various vowel sounds which have been so often discussed and so little understood, and of harmonising their relations with each other.

The vowel sounds of the upper, or oxyton series, are short in comparison with the lower, or baryton series, of which they are harmonics, the two being separated from each other by, probably, an entire octave. Thus, the \bar{e} in *weal* is the baryton. and the \check{e} in *him* is the oxyton. If it be attempted to pronounce the former as an acute it only takes the tone of the latter, \bar{e} becomes \check{e} ; on the other hand, if the process be reversed, \check{e} will find utterance in \bar{e} .

The sound of \bar{o} in *school*, under similar conditions, is the fundamental of \check{o} in *bull*; that of \bar{e}' in *cur*, of \check{e}' in *cur* pronounced as the first syllable in *curry*; that of \bar{a} , in *hare*, of \check{a} the first syllable in *ever*; that of \bar{o}' in *war*, of \check{o}' in *warrior*; that of \bar{o} in *note*, of \check{o} in *nöbility*; that of \bar{a}' in *father*, of \check{a}' in *fathom*.

These examples are types of an inflexible law, which, being physical, instinctively governs speech.

The two series of vowel-sounds, then, stand thus:—

Barytons: \bar{e} , \bar{o} , \bar{e}' , \bar{a} , \bar{o}' , \bar{o} , \bar{a}' .

Oxytons: \check{e} , \check{o} , \check{e}' , \check{a} , \check{o}' , \check{o} , \check{a}' .

Whatever the order of succession in point of length may be in either series it naturally belongs to the other. The oxytons diphthongise with each other; the barytons do not; it is therefore by the former that their measure must be effected, both in their union with each other, as diphthongs, and with the baryton series.

It happens that in every diphthong a longer and shorter sound manifests itself to an attentive ear, whence the power is obtained of determining the relative length of vowel sounds.

It is necessary to remark here that while diphthongism dominates all language, even to the order and sequence of sounds in a sentence, its importance remains unrecognised. This circumstance is principally due to false opinions on the power of *w* and *y*, which, being sometimes vowels and at other times consonants, possess functions which have not been accurately defined. So loose is the reasoning on this subject that *e* is allowed to be a vowel in the diphthong *u* (*eu*) in *mute*, but in *yew*, where the initial does the work of *e*, it is thought to be consonantal, though the same sound is observed in both cases.

The range of diphthongism, and its wide functions, depends entirely on the powers of *e* and *oo*, vowels which have been concealed, except in the instances given, in the consonant symbols of *y* and *w*, the explanation of which error is given in the pages headed 'The English Alphabet.'

The oxytons diphthongise with each other; the barytons do not, but both unite monosyllabically with *ě* and *ōō*, without which no diphthongal series can be formed. The manner in which this union is effected has been shown in the series of examples given for the purpose of demonstrating the existence of a middle length in diphthongs as well as in vowels.

In looking through these examples, it is observable that *ě* does not unite monosyllabically with *ē*; in attempting the union it is found that *ě* is consonanted into *y*, as in *ye*; it is further observable that *ōō* does not unite with *ōō*, but becomes *w*, as in *woo*, *swoon*. With these exceptions, *ě* and *ōō*, as initials, unite diphthongally with all the other vowels, both of the acute and grave series. The predominant sound, that of accent, in all these unions, deserts *ě* and *ōō*, except when these two are united; and then the accent falls on the terminal, as in *ěōō*, *yoú*, and in *ōōě*, *wé*. This example is the type of reversible diphthongs, which are numerous and always connected with *ě* and *ōō*.

Both *ě* and *ōō*, alike, have twelve unions, as initials, with the other vowels, and in all these, with the exception cited, they fail to bear the accent. As terminals, *ě* has three unions, and *ōō* has two: these are, *ǎě*, in *áche*; *ǒ'ě*, in *bóy*; *ǎ'ě*, in

hígh; *ǒ ǒǒ*, in *knóll*, *cóal*; *ǎ' ǒǒ*, in *hów*. In all of these, *ě* and *ǒǒ* fail to bear the accent.

The accent-quantity being longer than the short sounds which precede or follow it, and *ě* and *ǒǒ* assuming the place of a short sound in all the vowel-diphthongs, with the exception cited, it is shown that these two vowels are the shortest, and that they follow their consonanted homologues, *y* and *w*, in the tonic scale.

It is important to remark that these two vowels are apparently equal in length, whence arises an anomaly, since, if *ǒǒ* bears the accent in *ě ǒǒ*, *yoú*, it must be longer than *ě*; and if *ě* bears the accent in *ǒǒ ě*, *wé*, it must be longer than *ǒǒ*. This can be explained, for it is observable that in these the accent-bearing vowel is spontaneously lengthened, and that its fellow is shortened, to respond to the necessity which diphthongal union entails. This necessity of adaptation is instinctive in speech; and in order to preserve the precise relation between the accent-sound and the short sound by which it is displayed, it constantly happens that a new sound is substituted for one that is refractory, instances of which will be brought forward on some later occasion.

It remains to determine the relative lengths of the five other vowels which belong to the series of acute sounds—namely, *ě'*, *ǎ*, *ǒ'*, *ǒ*, *ǎ'*—and on the principle adopted, that of the accent standard of length, this becomes easy. The sound of *ě'* does not diphthongise as an initial, but does so four times as a terminal, but bearing the accent only in one case, as instanced in *ě ě'* (*ýěárn*); while in such words as *here* (*ě ě'*), *tour* (*ǒǒ ě'*), and *ore* (*ǒ ě'*), the diphthongal sounds are equally balanced, and there is no accent.

The sound of *ǎ* diphthongises once as an initial, as in *ǎ ě* (*ache*); twice as a terminal, as in *ě ǎ* (*ýěll*), and *ǒǒ ǎ* (*web*), and bears the accent in all three.

The sound of *ǒ'* diphthongises once as an initial, as in *ǒ' ě* (*boy*); twice as a terminal, as in *ě ǒ'* (*yacht*), and *ǒǒ ǒ'* (*what*), and bears the accent in all three.

The sound of *ǒ* diphthongises twice as an initial, as in *ǒ ě* (*ore*), but without accent; and in *ǒ ǒǒ* (*note*); twice as a terminal, as in *ě ǒ* (*ýeó*), and *ǒǒ ǒ* (*wo*), bearing the accent in the latter three.

Lastly *ǎ'* bears the accent four times, twice as an initial, as in *ǎ' ě* (*high*), and *ǎ' oň* (*mount*); twice as a terminal, as in *ě ǎ'* (*ýǎp*), and in *oň ǎ'* (*whack*). It has therefore the greatest accent-bearing power, or capacity for length, of all the vowels.

The grave vowels, *ē*, *ōō*, *ē'*, *ā*, *ō'*, *ō*, *ā*, follow in the same order as the acute, and succeed them in the tonic scale, as already set forth.

It has been the present purpose only to establish a Tonic Scale of Alphabetic Sounds; this aim, as it is hoped, being achieved, it remains to be said that the application of such a scale is co-extensive with all speech, that it is a key to those intricate and subtle effects of language which so constantly impress the mind, and which appear beyond the power of reason to explain.

The application of this scale in all its extent will be offered on some other occasion.

